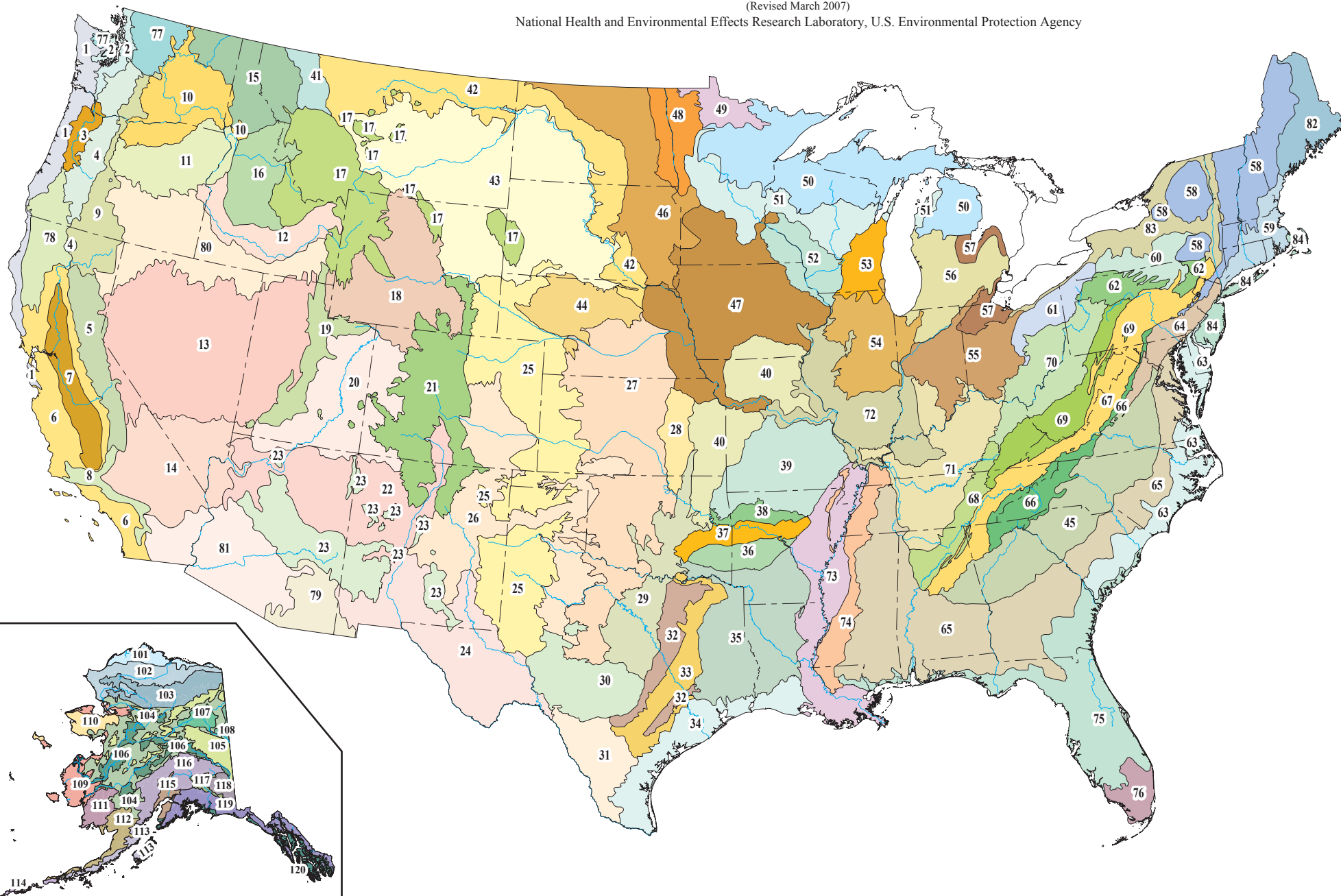










































































































Level III Ecoregions of the Continental United States

(Revised March 2007)

National Health and Environmental Effects Research Laboratory, U.S. Environmental Protection Agency



Omernik Level III Ecoregions Key

	1. Coast Range		58. Northeast Highlands
	2. Puget Lowland		59. Northeast Coastal Zone
	3. Willamette Valley		60. Northern Appalachian Plateau and Uplands
	4. Cascades		61. Erie Drift Plain
	5. Sierra Nevada		62. North Central Appalachians
	6. Southern and Central California Chaparral and Oak Woodlands		63. Middle Atlantic Coastal Plain
	7. Central California Valley		64. Northern Piedmont
	8. Southern California Mountains		65. Southeastern Plains
	9. Eastern Cascades Slopes and Foothills		66. Blue Ridge
	10. Columbia Plateau		67. Ridge and Valley
	11. Blue Mountains		68. Southwestern Appalachians
	12. Snake River Plain		69. Central Appalachians
	13. Central Basin and Range		70. Western Allegheny Plateau
	14. Mojave Basin and Range		71. Interior Plateau
	15. Northern Rockies		72. Interior River Valleys and Hills
	16. Idaho Batholith		73. Mississippi Alluvial Plain
	17. Middle Rockies		74. Mississippi Valley Loess Plains
	18. Wyoming Basin		75. Southern Coastal Plain
	19. Wasatch and Uinta Mountains		76. Southern Florida Coastal Plain
	20. Colorado Plateaus		77. North Cascades
	21. Southern Rockies		78. Klamath Mountains
	22. Arizona/New Mexico Plateau		79. Madrean Archipelago
	23. Arizona/New Mexico Mountains		80. Northern Basin and Range
	24. Chihuahuan Deserts		81. Sonoran Basin and Range
	25. High Plains		82. Laurentian Plains and Hills
	26. Southwestern Tablelands		83. Eastern Great Lakes and Hudson Lowlands
	27. Central Great Plains		84. Atlantic Coastal Pine Barrens
	28. Flint Hills		
	29. Cross Timbers		101. Arctic Coastal Plain
	30. Edwards Plateau		102. Arctic Foothills
	31. Southern Texas Plains		103. Brooks Range
	32. Texas Blackland Prairies		104. Interior Forested Lowlands and Uplands
	33. East Central Texas Plains		105. Interior Highlands
	34. Western Gulf Coastal Plain		106. Interior Bottomlands
	35. South Central Plains		107. Yukon Flats
	36. Ouachita Mountains		108. Ogilvie Mountains
	37. Arkansas Valley		109. Subarctic Coastal Plains
	38. Boston Mountains		110. Seward Peninsula
	39. Ozark Highlands		111. Ahklun and Kilbuck Mountains
	40. Central Irregular Plains		112. Bristol Bay-Nushagak Lowlands
	41. Canadian Rockies		113. Alaska Peninsula Mountains
	42. Northwestern Glaciated Plains		114. Aleutian Islands (Western portion not shown)
	43. Northwestern Great Plains		115. Cook Inlet
	44. Nebraska Sand Hills		116. Alaska Range
	45. Piedmont		117. Copper Plateau
	46. Northern Glaciated Plains		118. Wrangell Mountains
	47. Western Corn Belt Plains		119. Pacific Coastal Mountains
	48. Lake Agassiz Plain		120. Coastal Western Hemlock-Sitka Spruce Forests
	49. Northern Minnesota Wetlands		
	50. Northern Lakes and Forests		
	51. North Central Hardwood Forests		
	52. Driftless Area		
	53. Southeastern Wisconsin Till Plains		
	54. Central Corn Belt Plains		
	55. Eastern Corn Belt Plains		
	56. Southern Michigan/Northern Indiana Drift Plains		
	57. Huron/Erie Lake Plains		

About Omernik Level III Ecoregions of the Continental United States

The ecoregions shown here have been derived from Omernik (1987) and from refinements of Omernik's framework that have been made for other projects. These ongoing or recently completed projects, conducted in collaboration with the U.S. EPA regional offices, state resource management agencies, and with other federal agencies, involve refining ecoregions, defining subregions, and locating sets of reference sites. Designed to serve as a spatial framework for environmental resource management, ecoregions denote areas within which ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. The most immediate needs are to develop regional biological criteria and water quality standards and to set management goals for nonpoint source pollution.

The approach used to compile this map is based on the premise that ecological regions can be identified through the analysis of the patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Wiken 1986; Omernik 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. Because of possible confusion with other meanings of terms for different levels of ecological regions, a Roman numeral classification scheme has been adopted for this effort. Level I is the coarsest level, dividing North America into 15 ecological regions, whereas at Level II the continent is subdivided into 52 classes (CEC 1997). Level III is the hierarchical level shown on this map. For portions of the United States (see map inset) the ecoregions have been further subdivided to Level IV. The applications of the ecoregions are explained in Gallant et al. (1989) and in reports and publications from the state and regional projects. For additional information, contact James M. Omernik, U.S. EPA National Health and Environmental Effects Laboratory (NHEERL), 200 SW 35th Street, Corvallis, OR 97333; phone: (541) 754-4458, email: omernik.james@epa.gov.

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Ecoregion maps, publications, GIS files, and contact information are available at
<http://www.epa.gov/wed/pages/ecoregions.htm>

PRIMARY DISTINGUISHING CHARACTERISTICS OF LEVEL III ECOREGIONS OF THE CONTINENTAL UNITED STATES

(April 2002 Draft from Omernik Website)

1. COAST RANGE

The low mountains of the Coast Range are covered by highly productive, rain-drenched coniferous forests. Sitka spruce and coastal redwood forests originally dominated the fog-shrouded coast, while a mosaic of western red cedar, western hemlock, and seral Douglas-fir blanketed inland areas. Today Douglas-fir plantations are prevalent on the intensively logged and managed landscape.

2. PUGET LOWLANDS

This broad rolling lowland is characterized by a mild maritime climate. It occupies a continental glacial trough and is composed of many islands, peninsulas, and bays in the Puget Sound area. Coniferous forest originally grew on the ecoregion's ground moraines, outwash plains, floodplains, and terraces. The distribution of forest species is affected by the rainshadow from the Olympic Mountains.

3. WILLAMETTE VALLEY

Rolling prairies, deciduous/coniferous forests, and extensive wetlands characterized the pre-19th century landscape of this broad, lowland valley. The Willamette Valley is distinguished from the adjacent Coast Range (1) and Cascades (4) by lower precipitation, less relief, and a different mosaic of vegetation. Landforms consist of terraces and floodplains that are interlaced and surrounded by rolling hills. Productive soils and a temperate climate make it one of the most important agricultural areas in Oregon.

4. CASCADES

This mountainous ecoregion is underlain by Cenozoic volcanics and has been affected by alpine glaciations. It is characterized by steep ridges and river valleys in the west, a high plateau in the east, and both active and dormant volcanoes. Elevations range upwards to 4,390 meters. Its moist, temperate climate supports an extensive and highly productive coniferous forest. Subalpine meadows occur at high elevations.

5. SIERRA NEVADA

The Sierra Nevada is a deeply dissected block fault that rises sharply from the arid basin and range ecoregions on the east and slopes gently toward the Central California Valley to the west. The eastern portion has been strongly glaciated and generally contains higher mountains than are found in the Klamath Mountains to the northwest. Much of the central and southern parts of the region is underlain by granite as compared to the mostly sedimentary formations of the Klamath Mountains and volcanic rocks of the Cascades. The higher elevations of this region are largely federally owned and include several national parks. The vegetation grades from mostly ponderosa pine at the lower elevations on the west side and lodgepole pine on the east side, to fir and spruce at the higher elevations. Alpine conditions exist at the highest elevations.

6. SOUTHERN AND CENTRAL CALIFORNIA CHAPARRAL AND OAK WOODLANDS

The primary distinguishing characteristic of this ecoregion is its Mediterranean climate of hot dry summers and cool moist winters, and associated vegetative cover comprising mainly chaparral and oak woodlands; grasslands occur in some lower elevations and patches of pine are found at higher elevations. Most of the region consists of open low mountains or foothills, but there are areas of irregular plains in the south and near the border of the adjacent Central California Valley ecoregion. Much of this region is grazed by domestic livestock; very little land has been cultivated.

7. CENTRAL CALIFORNIA VALLEY

Flat, intensively farmed plains having long, hot dry summers and cool wet winters distinguish the Central California Valley from its neighboring ecoregions that are either hilly or mountainous, forest or shrub covered, and generally nonagricultural. Nearly half of the region is in cropland, about three fourths of which is irrigated. Environmental concerns in the region include salinity due to evaporation of irrigation water, groundwater contamination from heavy use of agricultural chemicals, wildlife habitat loss, and urban sprawl.

8. SOUTHERN CALIFORNIA MOUNTAINS

Like the other ecoregions in central and southern California, the Southern California Mountains has a Mediterranean climate of hot dry summers and moist cool winters. Although Mediterranean types of vegetation such as chaparral and oak woodlands predominate, the elevations are considerably higher in this region, the summers are slightly cooler, and precipitation amounts are greater, causing the landscape to be more densely vegetated and stands of ponderosa pine to be larger and more numerous than in the adjacent regions. Severe erosion problems are common where the vegetation cover has been destroyed by fire or overgrazing.

9. EASTERN CASCADE SLOPES AND FOOTHILLS

The Eastern Cascade Slopes and Foothills ecoregion is in the rainshadow of the Cascade Mountains. Its climate exhibits greater temperature extremes and less precipitation than ecoregions to the west. Open forests of ponderosa pine and some lodgepole pine distinguish this region from the higher ecoregions to the west where fir and hemlock forests are common, and the lower dryer ecoregions to the east where shrubs and grasslands are predominant. The vegetation is adapted to the prevailing dry continental climate and is highly susceptible to wildfire. Volcanic cones and buttes are common in much of the region.

10. COLUMBIA PLATEAU

The Columbia Plateau is an arid sagebrush steppe and grassland, surrounded on all sides by moister, predominantly forested, mountainous ecological regions. This region is underlain by basalt up to two miles thick. It is covered in some places by loess soils that have been extensively cultivated for wheat, particularly in the eastern portions of the region where precipitation amounts are greater.

11. BLUE MOUNTAINS

This ecoregion is distinguished from the neighboring Cascades and Northern Rockies ecoregions because the Blue Mountains are generally not as high and are considerably more open. Like the Cascades, but unlike the Northern Rockies, the region is mostly volcanic in origin. Only the few higher ranges, particularly the Wallowa and Elkhorn Mountains, consist of intrusive rocks that rise above the dissected lava surface of the region. Unlike the bulk of the Cascades and Northern Rockies, much of this ecoregion is grazed by cattle.

12. SNAKE RIVER PLAIN

This portion of the xeric intermontane basin and range area of the western United States is considerably lower and more gently sloping than the surrounding ecoregions. Mostly because of the available water for irrigation, a large percent of the alluvial valleys bordering the Snake River are in agriculture, with sugar beets, potatoes, and vegetables being the principal crops. Cattle feedlots and dairy operations are also common in the river plain. Except for the scattered barren lava fields, the remainder of the plains and low hills in the ecoregion have a sagebrush steppe potential natural vegetation and are now used for cattle grazing.

13. CENTRAL BASIN AND RANGE

The Central Basin and Range ecoregion is internally drained and is characterized by a mosaic of xeric basins, scattered low and high mountains, and salt flats. It has a hotter and drier climate, more shrubland, and more mountain ranges than the Snake River Plain and Northern Basin and Range ecoregions to the north. Basins are covered by Great Basin sagebrush or saltbush-greasewood vegetation that grow in Aridisols; cool season grasses are less common than in the Mollisols of the Snake River Plain and Northern Basin and Range. The region is not as hot as the Mojave and Sonoran Basin and Range ecoregions and it has a greater percent of land that is grazed.

14. MOJAVE BASIN AND RANGE

This ecoregion contains scattered mountains which are generally lower than those of the Central Basin and Range. Potential natural vegetation in this region is predominantly creosote bush, as compared to the mostly saltbush-greasewood and Great Basin sagebrush of the ecoregion to the north, and creosote bush-bur sage with large patches of palo verde-cactus shrub and saguaro cactus in the Sonoran Basin and Range to the south. Most of this region is federally owned and there is relatively little grazing activity because of the lack of water and forage for livestock. Heavy use of off-road vehicles and motorcycles in some areas has caused severe wind and water erosion problems.

15. NORTHERN ROCKIES

The high, rugged Northern Rockies is mountainous and lies east of the Cascades. Despite its inland position, climate and vegetation are, typically, marine-influenced. Douglas fir, subalpine fir, Englemann spruce, and ponderosa pine and Pacific

indicators such as western red cedar, western hemlock, and grand fir are found in the ecoregion. The vegetation mosaic is different from that of the Middle Rockies which is not dominated by maritime species. The Northern Rockies ecoregion is not as high nor as snow- and ice-covered as the Canadian Rockies although alpine characteristics occur at highest elevations and include numerous glacial lakes. Granitics and associated management problems are less extensive than in the Idaho Batholith.

16. IDAHO BATHOLITH

This ecoregion is a dissected, partially glaciated, mountainous plateau. Many perennial streams originate here and water quality can be high if basins are undisturbed. Deeply weathered, acidic, intrusive igneous rock is common and is far more extensive than in the Northern Rockies or the Middle Rockies. Soils are sensitive to disturbance especially when stabilizing vegetation is removed. Land uses include logging, grazing, and recreation. Mining and related damage to aquatic habitat was widespread. Grand fir, Douglas-fir and, at higher elevations, Engelmann spruce, and subalpine fir occur; ponderosa pine, shrubs, and grasses grow in very deep canyons. Maritime influence lessens toward the south and is never as strong as in the Northern Rockies.

17. MIDDLE ROCKIES

The climate of the Middle Rockies lacks the strong maritime influence of the Northern Rockies. Mountains have Douglas-fir, subalpine fir, and Engelmann spruce forests and alpine areas; Pacific tree species are never dominant. Forests can be open. Foothills are partly wooded or shrub- and grass-covered. Intermontane valleys are grass- and/or shrub-covered and contain a mosaic of terrestrial and aquatic fauna that is distinct from the nearby mountains. Many mountain-fed, perennial streams occur and differentiate the intermontane valleys from the Northwestern Great Plains. Granitics and associated management problems are less extensive than in the Idaho Batholith. Recreation, logging, mining, and summer livestock grazing are common land uses.

18. WYOMING BASIN

This ecoregion is a broad intermontane basin dominated by arid grasslands and shrublands and interrupted by high hills and low mountains. Nearly surrounded by forest covered mountains, the region is somewhat drier than the Northwestern Great Plains to the northeast and does not have the extensive cover of pinyon-juniper woodland found in the Colorado Plateaus to the south. Much of the region is used for livestock grazing, although many areas lack sufficient vegetation to support this activity. The region contains major producing natural gas and petroleum fields.

19. WASATCH AND UINTA MOUNTAINS

This ecoregion is composed of a core area of high, precipitous mountains with narrow crests and valleys flanked in some areas by dissected plateaus and open high mountains. The elevational banding pattern of vegetation is similar to that of the Southern Rockies except that aspen, chaparral, and juniper-pinyon and oak are more common at middle elevations. This characteristic, along with a far lesser extent of lodgepole pine and greater use of the region for grazing livestock in the summer months, distinguish the Wasatch and Uinta Mountains ecoregion from the more northerly Middle Rockies.

20. COLORADO PLATEAUS

Rugged tableland topography is typical of the Colorado Plateau ecoregion. Precipitous side-walls mark abrupt changes in local relief, often from 300 to 600 meters. The region is more elevated than the Wyoming Basin to the north and therefore contains a far greater extent of pinyon-juniper woodlands. However, the region also has large low lying areas containing saltbrush-greasewood (typical of hotter drier areas), which are generally not found in the higher Arizona/New Mexico Plateau to the south where grasslands are common.

21. SOUTHERN ROCKIES

The Southern Rockies are composed of high elevation, steep rugged mountains. Although coniferous forests cover much of the region, as in most of the mountainous regions in the western United States, vegetation, as well as soil and land use, follows a pattern of elevational banding. The lowest elevations are generally grass or shrub covered and heavily grazed. Low to middle elevations are also grazed and covered by a variety of vegetation types including Douglas fir, ponderosa pine, aspen, and juniper oak woodlands. Middle to high elevations are largely covered by coniferous forests and have little grazing activity. The highest elevations have alpine characteristics.

22. ARIZONA/NEW MEXICO PLATEAU

The Arizona/New Mexico Plateau represents a large transitional region between the semiarid grasslands and low relief tablelands of the Southwestern Tablelands ecoregion in the east, the drier shrublands and woodland covered higher relief

tablelands of the Colorado Plateau in the north, and the lower, hotter, less vegetated Mojave Basin and Range in the west and Chihuahuan Deserts in the south. Higher, more forest covered, mountainous ecoregions border the region on the northeast and southwest. Local relief in the region varies from a few meters on plains and mesa tops to well over 300 meters along tableland side slopes.

23. ARIZONA/NEW MEXICO MOUNTAINS

The Arizona/New Mexico Mountains are distinguished from neighboring mountainous ecoregions by their lower elevations and an associated vegetation indicative of drier, warmer environments, which is also due in part to the region's more southerly location. Forests of spruce, fir, and Douglas fir, that are common in the Southern Rockies and the Uinta and Wasatch Mountains, are only found in a few high elevation parts of this region. Chaparral is common on the lower elevations, pinyon-juniper and oak woodlands are found on lower and middle elevations, and the higher elevations are mostly covered with open to dense ponderosa pine forests.

24. CHIHUAHUAN DESERTS

This desertic ecoregion extends from the Madrean Archipelago in southeastern Arizona to the Edwards Plateau in south-central Texas. The region comprises broad basins and valleys bordered by sloping alluvial fans and terraces. Isolated mesas and mountains are located in the central and western parts of the region. Vegetative cover is predominantly arid grass and shrubland, except on the higher mountains where oak-juniper woodlands occur.

25. WESTERN HIGH PLAINS

Higher and drier than the Central Great Plains (27) to the east, and in contrast to the irregular, mostly grassland or grazing land of the Northwestern Great Plains (43) to the north, much of the Western High Plains comprises smooth to slightly irregular plains having a high percentage of cropland. Grama-buffalo grass is the potential natural vegetation in this region as compared to mostly wheatgrass-needlegrass to the north, Trans-Pecos shrub savanna to the south, and taller grasses to the east. The northern boundary of this ecological region is also the approximate northern limit of winter wheat and sorghum and the southern limit of spring wheat.

26. SOUTHWESTERN TABLELANDS

Unlike most adjacent Great Plains ecological regions, little of the Southwestern Tablelands is in cropland. Much of this elevated tableland is in sub-humid grassland and semiarid range land. The potential natural vegetation in this region is grama-buffalo grass with some mesquite-buffalo grass in the southeast and shinnery (midgrass prairie with open low and shrubs) along the Canadian River.

27. CENTRAL GREAT PLAINS

The Central Great Plains are slightly lower, receive more precipitation, and are somewhat more irregular than the Western High Plains to the west. Once a grassland, with scattered low trees and shrubs in the south, much of this ecological region is now cropland, the eastern boundary of the region marking the eastern limits of the major winter wheat growing area of the United States.

28. FLINT HILLS

The Flint Hills is a region of rolling hills with relatively narrow steep valleys, and is composed of shale and cherty limestone with rocky soils. In contrast to surrounding ecological regions that are mostly in cropland, most of the Flint Hills region is grazed by beef cattle. The Flint Hills mark the western edge of the tallgrass prairie, and contain the largest remaining intact tallgrass prairie in the Great Plains.

29. CENTRAL OKLAHOMA/TEXAS PLAINS

The Central Oklahoma/Texas Plains ecoregion is a transition area between the once prairie, now winter wheat growing regions to the west, and the forested low mountains of eastern Oklahoma. The region does not possess the arability and suitability for crops such as corn and soybeans that are common in the Central Irregular Plains to the northeast.

Transitional "cross-timbers" (little bluestem grassland with scattered blackjack oak and post oak trees) is the native vegetation, and presently rangeland and pastureland comprise the predominant land cover. Oil extraction has been a major activity in this region for over eighty years.

30. EDWARDS PLATEAU

This ecoregion is largely a dissected plateau that is hillier in the south and east where it is easily distinguished from bordering ecological regions by a sharp fault line. The region contains a sparse network of perennial streams, but they are

relatively clear and cool compared to those of surrounding areas. Originally covered by juniper-oak savanna and mesquite-oak savanna, most of the region is used for grazing beef cattle, sheep, goats, and wildlife. Hunting leases are a major source of income.

31. SOUTHERN TEXAS PLAINS

This rolling to moderately dissected plain was once covered with grassland and savanna vegetation. Having been subject to long continued grazing, thorny brush is now the predominant vegetation type. This “brush country”, as it is called locally, has its greatest extent in Mexico and contains a greater and more distinct diversity of animal life than that found elsewhere in Texas

32. TEXAS BLACKLAND PRAIRIES

The Texas Blackland Prairies is a disjunct ecological region distinguished from surrounding regions by its fine textured clayey soils and predominantly prairie potential natural vegetation. This region now contains a higher percent of cropland than adjacent regions, although much of the land has been recently converted to urban and industrial uses.

33. EAST CENTRAL TEXAS PLAINS

Also called the Claypan Area, this region of irregular plains was originally covered by a post oak savanna vegetation, in contrast to the more open prairie-type regions to the north, south and west and the piney woods to the east. The bulk of this region is now used for pasture and range.

34. WESTERN GULF COASTAL PLAIN

The principal distinguishing characteristics of the Western Gulf Coastal Plain are its relatively flat coastal plain topography and mainly grassland potential natural vegetation.

Inland from this region the plains are more irregular and have mostly forest or savanna-type vegetation potentials. Largely because of these characteristics, a higher percentage of the land is in cropland than in bordering ecological regions. Recent urbanization and industrialization have become concerns in this region.

35. SOUTH CENTRAL PLAINS

Locally termed the “piney woods”, this region of mostly irregular plains was once blanketed by oak-hickory-pine forests, but is now predominantly in loblolly and shortleaf pine. Only about one sixth of the region is in cropland, whereas about two thirds is in forests and woodland. Lumber and pulpwood production are major economic activities

36. OUACHITA MOUNTAINS

The Ouachita Mountains ecological region is made up of sharply defined east-west trending ridges, formed through erosion of compressed sedimentary rock formations. Once covered by oak-hickory-pine forests, most of this region is now in loblolly and shortleaf pine. Commercial logging is the major land use in the region.

37. ARKANSAS VALLEY

A region of mostly forested valleys and ridges, the physiography of the Arkansas Valley is much less irregular than that of the Boston Mountains to the north and the Ouachita Mountains to the south, but is more irregular than the ecological regions to the west and east. About one fourth of the region is grazed and roughly one tenth is cropland. In the Arkansas Valley, even streams that have been relatively unimpacted by human activities have considerably lower dissolved oxygen levels, and hence support different biological communities, than those of most of the adjacent regions.

38. BOSTON MOUNTAINS

In contrast to the nearby Ouachita Mountains region which comprises folded and faulted linear ridges mostly covered by pine forests, the Boston Mountains ecological region consists of a deeply dissected sandstone and shale plateau, originally covered by oak-hickory forests. Red oak, white oak, and hickory remain the dominant vegetation types in this region, although shortleaf pine and eastern red cedar are found in many of the lower areas and on some south- and west-facing slopes. The region is sparsely populated and recreation is a principal land use.

39. OZARK HIGHLANDS

The Ozark Highlands ecoregion has a more irregular physiography and is generally more forested than adjacent regions, with the exception of the Boston Mountains (38) to the south. The majority of this dissected limestone plateau is forested; oak forests are predominant, but mixed stands of oak and pine are also common. Karst features, including caves, springs, and spring-fed streams are found throughout the Ozark Highlands. Less than one fourth of the core of this region has been

cleared for pasture and cropland, but half or more of the periphery, while not as agricultural as bordering ecological regions, is in cropland and pasture.

40. CENTRAL IRREGULAR PLAINS

The Central Irregular Plains have a mix of land use and are topographically more irregular than the Western Corn Belt Plains (47) to the north, where most of the land is in crops. The region, however, is less irregular and less forest covered than the ecoregions to the south and east. The potential natural vegetation of this ecological region is a grassland/forest mosaic with wider forested strips along the streams compared to Ecoregion 47 to the north. The mix of land use activities in the Central Irregular Plains also includes mining operations of high-sulfur bituminous coal. The disturbance of these coal strata in southern Iowa and northern Missouri has degraded water quality and affected aquatic biota.

41. CANADIAN ROCKIES

As its name indicates, most of this region is located in Canada. It straddles the border between Alberta and British Columbia in Canada and extends southeastward into northwestern Montana. The region is generally higher and more ice-covered than the Northern Rockies. Vegetation is mostly Douglas fir, spruce, and lodgepole pine at lower elevations and alpine fir at middle elevations. The higher elevations are treeless alpine. A large part of the region is in national parks where tourism is the major land use. Forestry and mining occur on the nonpark lands.

42. NORTHWESTERN GLACIATED PLAINS

The Northwestern Glaciated Plains ecoregion is a transitional region between the generally more level, moister, more agricultural Northern Glaciated Plains to the east and the generally more irregular, dryer, Northwestern Great Plains to the west and southwest. The western and southwestern boundary roughly coincides with the limits of continental glaciation. Pocking this ecoregion is a moderately high concentration of semi-permanent and seasonal wetlands, locally referred to as Prairie Potholes.

43. NORTHWESTERN GREAT PLAINS

The Northwestern Great Plains ecoregion encompasses the Missouri Plateau section of the Great Plains. It is a semiarid rolling plain of shale and sandstone punctuated by occasional buttes. Native grasslands, largely replaced on level ground by spring wheat and alfalfa, persist in rangeland areas on broken topography. Agriculture is restricted by the erratic precipitation and limited opportunities for irrigation.

44. NEBRASKA SANDHILLS

The Nebraska Sandhills comprise one of the most distinct and homogenous ecoregions in North America. One of the largest areas of grass stabilized sand dunes in the world, this region is generally devoid of cropland agriculture, and except for some riparian areas in the north and east, the region is treeless. Large portions of this ecoregion contain numerous lakes and wetlands and have a lack of streams.

45. PIEDMONT

Considered the nonmountainous portion of the old Appalachians Highland by physiographers, the northeast-southwest trending Piedmont ecoregion comprises a transitional area between the mostly mountainous ecoregions of the Appalachians to the northwest and the relatively flat coastal plain to the southeast. It is a complex mosaic of Precambrian and Paleozoic metamorphic and igneous rocks, with moderately dissected irregular plains and some hills. The soils tend to be finer-textured than in coastal plain regions (63, 65). Once largely cultivated, much of this region has reverted to successional pine and hardwood woodlands, with an increasing conversion to an urban and suburban land cover.

46. NORTHERN GLACIATED PLAINS

The Northern Glaciated Plains ecoregion is characterized by a flat to gently rolling landscape composed of glacial till. The subhumid conditions foster a transitional grassland containing tallgrass and shortgrass prairie. High concentrations of temporary and seasonal wetlands create favorable conditions for waterfowl nesting and migration. Though the till soils are very fertile, agricultural success is subject to annual climatic fluctuations.

47. WESTERN CORN BELT PLAINS

Once covered with tallgrass prairie, over 75 percent of the Western Corn Belt Plains is now used for cropland agriculture and much of the remainder is in forage for livestock. A combination of nearly level to gently rolling glaciated till plains and hilly loess plains, an average annual precipitation of 63-89 cm, which occurs mainly in the growing season, and

fertile, warm, moist soils make this one of the most productive areas of corn and soybeans in the world. Major environmental concerns in the region include surface and groundwater contamination from fertilizer and pesticide applications as well as impacts from concentrated livestock production.

48. LAKE AGASSIZ PLAIN

Glacial Lake Agassiz was the last in a series of proglacial lakes to fill the Red River valley in the three million years since the beginning of the Pleistocene. Thick beds of lake sediments on top of glacial till create the extremely flat floor of the Lake Agassiz Plain. The historic tallgrass prairie has been replaced by intensive row crop agriculture. The preferred crops in the northern half of the region are potatoes, beans, sugar beets and wheat; soybeans, sugar beets, and corn predominate in the south.

49. NORTHERN MINNESOTA WETLANDS

Much of the Northern Minnesota Wetlands is a vast and nearly level marsh that is sparsely inhabited by humans and covered by swamp and boreal forest vegetation. Formerly occupied by broad glacial lakes, most of the flat terrain in this ecoregion is still covered by standing water.

50. NORTHERN LAKES AND FORESTS

The Northern Lakes and Forests is a region of nutrient poor glacial soils, coniferous and northern hardwood forests, undulating till plains, morainal hills, broad lacustrine basins, and extensive sandy outwash plains. Soils in this ecoregion are thicker than in those to the north and generally lack the arability of soils in adjacent ecoregions to the south. The numerous lakes that dot the landscape are clearer and less productive than those in ecoregions to the south.

51. NORTH CENTRAL HARDWOOD FORESTS

The North Central Hardwood Forests is transitional between the predominantly forested Northern Lakes and Forests to the north and the agricultural ecoregions to the south. Land use/land cover in this ecoregion consists of a mosaic of forests, wetlands and lakes, cropland agriculture, pasture, and dairy operations.

52. DRIFTLESS AREA

The hilly uplands of the Driftless Area easily distinguish it from surrounding ecoregions. Much of the area consists of a deeply dissected, loess-capped, bedrock dominated plateau. The region is also called the Paleozoic Plateau because the landscape's appearance is a result of erosion through rock strata of Paleozoic age. Although there is evidence of glacial drift in the region, the influence of the glacial deposits has done little to affect the landscape compared to the subduing influences in adjacent ecoregions. Livestock and dairy farming are major land uses and have had a major impact on stream quality.

53. SOUTHEASTERN WISCONSIN TILL PLAINS

The Southeastern Wisconsin Till Plains supports a mosaic of vegetation types, representing a transition between the hardwood forests and oak savannas of the ecoregions to the west and the tall-grass prairies of the Central Corn Belt Plains to the south. Like the Corn Belt Plains, land use in the Southeastern Wisconsin Till Plains is mostly cropland, but the crops are largely forage and feed grains to support dairy operations, rather than corn and soybeans for cash crops.

54. CENTRAL CORN BELT PLAINS

Extensive prairie communities intermixed with oak-hickory forests were native to the glaciated plains of the Central Corn Belt Plains; they were a stark contrast to the hardwood forests that grew on the drift plains of ecoregions (55, 56) to the east. Ecoregions to the west (40, 47) were mostly treeless except along larger streams. Beginning in the nineteenth century, the natural vegetation was gradually replaced by agriculture. Farms are now extensive on the dark, fertile soils of the Central Corn Belt Plains and mainly produce corn and soybeans; cattle, sheep, poultry, and especially hogs are also raised, but they are not as dominant as in the drier Western Corn Belt Plains (47) to the west. Agriculture has affected stream chemistry, turbidity, and habitat.

55. EASTERN CORN BELT PLAINS

The Eastern Corn Belt Plains is primarily a rolling till plain with local end moraines; it had more natural tree cover and has lighter colored soils than the Central Corn Belt Plains (54). The region has loamier and better drained soils than the Huron/Erie Lake Plain (57), and richer soils than the Erie Drift Plain (61). Glacial deposits of Wisconsinan age are extensive. They are not as dissected nor as leached as the pre-Wisconsinan till which is restricted to the southern part of the region. Originally, beech forests were common on Wisconsinan soils while beech forests and elm-ash swamp forests

dominated the wetter pre-Wisconsinan soils. Today, extensive corn, soybean, and livestock production occurs and has affected stream chemistry and turbidity.

56. SOUTHERN MICHIGAN/NORTHERN INDIANA DRIFT PLAINS

Bordered by Lake Michigan on the west, this ecoregion is less agricultural than those (54, 55) to the south, it is better drained and contains more lakes than the flat agricultural lake plain (57) to the east, and its soils are not as nutrient poor as Ecoregion 50 to the north. The region is characterized by many lakes and marshes as well as an assortment of landforms, soil types, soil textures, and land uses. Broad till plains with thick and complex deposits of drift, paleobeach ridges, relict dunes, morainal hills, kames, drumlins, meltwater channels, and kettles occur. Oak-hickory forests, northern swamp forests, and beech forests were typical. Feed grain, soybean, and livestock farming as well as woodlots, quarries, recreational development, and urban-industrial areas are now common.

57. HURON/ERIE LAKE PLAIN

The Huron/Erie Lake Plain is a broad, fertile, nearly flat plain punctuated by relic sand dunes, beach ridges, and end moraines. Originally, soil drainage was typically poorer than in the adjacent Eastern Corn Belt Plains (55), and elm-ash swamp and beech forests were dominant. Oak savanna was typically restricted to sandy, well-drained dunes and beach ridges. Today, most of the area has been cleared and artificially drained and contains highly productive farms producing corn, soybeans, livestock, and vegetables; urban and industrial areas are also extensive. Stream habitat and quality have been degraded by channelization, ditching, and agricultural activities.

58. NORTHEASTERN HIGHLANDS

The Northeastern Highlands comprise a relatively sparsely populated region characterized by nutrient poor soils blanketed by northern hardwood and spruce fir forests. Land-surface form in the region grades from low mountains in the southwest and central portions to open high hills in the northeast. Many of the numerous glacial lakes in this region have been acidified by sulfur depositions originating in industrialized areas upwind from the ecoregion to the west.

59. NORTHEASTERN COASTAL ZONE

Like the Northeastern Highlands, the Northeastern Coastal Zone contains relatively nutrient poor soils and concentrations of continental glacial lakes, some of which are sensitive to acidification; however, this ecoregion contains considerably less surface irregularity and much greater concentrations of human population. Although attempts were made to farm much of the Northeastern Coastal Zone after the region was settled by Europeans, land use now mainly consists of forests and residential development.

60. NORTHERN APPALACHIAN PLATEAU AND UPLANDS

The Northern Appalachian Plateau and Uplands comprise a transition region between the less irregular, more agricultural and urbanized Erie/Ontario Drift and Lake Plain and Eastern Great Lakes and Hudson Lowlands ecoregions to the north and west and the more mountainous and forested, less populated North Central Appalachians and Northeastern Highlands ecoregions to the south and east. Much of this region is farmed and in pasture, with hay and grain for dairy cattle being the principal crops, but large areas are in forests of oak and northern hardwoods.

61. ERIE DRIFT PLAINS

Once largely covered by a maple-beech-birch forest, much of the Erie Drift Plain is now in farms, many associated with dairy operations. The Eastern Corn Belt Plains (55), which border the region on the west, are flatter, more fertile, and therefore more agricultural. The glaciated Erie Drift Plain is characterized by low rounded hills, scattered end moraines, kettles, and areas of wetlands, in contrast to the adjacent unglaciated ecoregions (70, 62) to the south and east that are more hilly and less agricultural. Areas of urban development and industrial activity occur locally. Lake Erie's influence substantially increases the growing season, winter cloudiness, and snowfall in the northernmost areas.

62. NORTH CENTRAL APPALACHIANS

More forest covered than most adjacent ecoregions, the North Central Appalachians ecoregion is part of a vast, elevated plateau composed of horizontally bedded sandstone, shale, siltstone, conglomerate, and coal. It is made up of plateau surfaces, high hills, and low mountains, which unlike the ecoregions to the north and west, was largely unaffected by continental glaciation. Only a portion of the Poconos section in the east has been glaciated. Land use activities are generally tied to forestry and recreation, but some coal and gas extraction occurs in the west.

63. MIDDLE ATLANTIC COASTAL PLAIN

The Middle Atlantic Coastal Plain ecoregion consists of low elevation flat plains, with many swamps, marshes, and estuaries. Forest cover in the region, once dominated by longleaf pine in the Carolinas, is now mostly loblolly and some shortleaf pine, with patches of oak, gum, and cypress near major streams, as compared to the mainly longleaf-slash pine forests of the warmer Southern Coastal Plain (75). Its low terraces, marshes, dunes, barrier islands, and beaches are underlain by unconsolidated sediments. Poorly drained soils are common, and the region has a mix of coarse and finer textured soils compared to the mostly coarse soils in the majority of Ecoregion 75. The Middle Atlantic Coastal Plain is typically lower, flatter, and more poorly drained than Ecoregion 65. Less cropland occurs in the southern portion of the region than in the central and northern parts of 63.

64. NORTHERN PIEDMONT

The Northern Piedmont is a transitional region of low rounded hills, irregular plains, and open valleys in contrast to the low mountains of Ecoregions 58, 66, and 67 to the north and west and the flatter coastal plains of Ecoregions 63 and 65 to the east. It is underlain by a mix of metamorphic, igneous, and sedimentary rocks, with soils that are mostly Alfisols and some Ultisols. Potential natural vegetation here was predominantly Appalachian oak forest as compared to the mostly oak-hickory-pine forests of the Piedmont (45) ecoregion to the southwest. The region now contains a higher proportion of cropland compared to the Piedmont.

65. SOUTHEASTERN PLAINS

These irregular plains have a mosaic of cropland, pasture, woodland, and forest. Natural vegetation was predominantly longleaf pine, with smaller areas of oak-hickory-pine and Southern mixed forest. The Cretaceous or Tertiary-age sands, silts, and clays of the region contrast geologically with the older metamorphic and igneous rocks of the Piedmont (45), and with the Paleozoic limestone, chert, and shale found in the Interior Plateau (71). Elevations and relief are greater than in the Southern Coastal Plain (75), but generally less than in much of the Piedmont. Streams in this area are relatively low-gradient and sandy-bottomed.

66. BLUE RIDGE

The Blue Ridge extends from southern Pennsylvania to northern Georgia, varying from narrow ridges to hilly plateaus to more massive mountainous areas, with high peaks reaching over 2000 meters. The mostly forested slopes, high-gradient, cool, clear streams, and rugged terrain occur primarily on metamorphic rocks, with minor areas of igneous and sedimentary geology. Annual precipitation of over 200 centimeters can occur in the wettest areas. The southern Blue Ridge is one of the richest centers of biodiversity in the eastern U.S. It is one of the most floristically diverse ecoregions, and includes Appalachian oak forests, northern hardwoods, and, at the highest elevations, Southeastern spruce-fir forests. Shrub, grass, and heath balds, hemlock, cove hardwoods, and oak-pine communities are also significant.

67. RIDGE AND VALLEY

This northeast-southwest trending, relatively low-lying, but diverse ecoregion is sandwiched between generally higher, more rugged mountainous regions with greater forest cover. As a result of extreme folding and faulting events, the region's roughly parallel ridges and valleys have a variety of widths, heights, and geologic materials, including limestone, dolomite, shale, siltstone, sandstone, chert, mudstone, and marble. Springs and caves are relatively numerous. Present-day forests cover about 50% of the region. The ecoregion has a diversity of aquatic habitats and species of fish.

68. SOUTHWESTERN APPALACHIANS

Stretching from Kentucky to Alabama, these open low mountains contain a mosaic of forest and woodland with some cropland and pasture. The eastern boundary of the ecoregion, along the more abrupt escarpment where it meets the Ridge and Valley, is relatively smooth and only slightly notched by small, eastward flowing streams. The western boundary, next to the Interior Plateau's Eastern Highland Rim, is more crenulated, with a rougher escarpment that is more deeply incised. The mixed mesophytic forest is restricted mostly to the deeper ravines and escarpment slopes, and the upland forests are dominated by mixed oaks with shortleaf pine. Ecoregion 68 has less agriculture than the adjacent Ecoregion 71. Coal mining occurs in several parts of the region.

69. CENTRAL APPALACHIANS

The Central Appalachian ecoregion, stretching from central Pennsylvania to northern Tennessee, is primarily a high, dissected, rugged plateau composed of sandstone, shale, conglomerate, and coal. The rugged terrain, cool climate, and infertile soils limit agriculture, resulting in a mostly forested land cover. The high hills and low mountains are covered by

a mixed mesophytic forest with areas of Appalachian oak and northern hardwood forest. Bituminous coal mines are common, and have caused the siltation and acidification of streams.

70. WESTERN ALLEGHENY PLATEAU

The hilly and wooded terrain of the Western Allegheny Plateau was not muted by glaciation and is more rugged than the agricultural till plains of Ecoregions 61 and 55 to the north and west, but is less rugged and not as forested as Ecoregion 69 to the east and south. Extensive mixed mesophytic forests and mixed oak forests originally grew in the Western Allegheny Plateau and, today, most of its rounded hills remain in forest; dairy, livestock, and general farms as well as residential developments are concentrated in the valleys. Horizontally-bedded sedimentary rock underlying the region has been mined for bituminous coal.

71. INTERIOR PLATEAU

The Interior Plateau is a diverse ecoregion extending from southern Indiana and Ohio to northern Alabama. Rock types are distinctly different from the coastal plain sediments and alluvial deposits to the west, and elevations are lower than the Appalachian ecoregions (66, 67, 68) to the east. Mississippian to Ordovician-age limestone, chert, sandstone, siltstone and shale compose the landforms of open hills, irregular plains, and tablelands. The natural vegetation is primarily oak-hickory forest, with some areas of bluestem prairie and cedar glades. The region has a diverse fish fauna.

72. INTERIOR RIVER VALLEYS AND HILLS

The Interior River Lowland is made up of many wide, flat-bottomed terraced valleys, forested valley slopes, and dissected glacial till plains. In contrast to the generally rolling to slightly irregular plains in adjacent ecological regions to the north (54), east (55) and west (40, 47), where most of the land is cultivated for corn and soybeans, a little less than half of this area is in cropland, about 30 percent is in pasture, and the remainder is in forest. Bottomland deciduous forests and swamp forests were common on wet lowland sites, with mixed oak and oak-hickory forests on uplands. Paleozoic sedimentary rock is typical and coal mining occurs in several areas.

73. MISSISSIPPI ALLUVIAL PLAIN

This riverine ecoregion extends from southern Illinois, at the confluence of the Ohio River with the Mississippi River, south to the Gulf of Mexico. It is mostly a broad, flat alluvial plain with river terraces, swales, and levees providing the main elements of relief. Soils are typically finer-textured and more poorly drained than the upland soils of adjacent Ecoregion 74, although there are some areas of coarser, better-drained soils. Winters are mild and summers are hot, with temperatures and precipitation increasing from north to south. Bottomland deciduous forest vegetation covered the region before much of it was cleared for cultivation. Presently, most of the northern and central parts of the region are in cropland and receive heavy treatments of insecticides and herbicides. Soybeans, cotton, and rice are the major crops.

74. MISSISSIPPI VALLEY LOESS PLAINS

This ecoregion stretches from near the Ohio River in western Kentucky to Louisiana. It consists primarily of irregular plains, some gently rolling hills, and near the Mississippi River, bluffs. Thick loess is one of the distinguishing characteristics. The bluff hills in the western portion contain soils that are deep, steep, silty, and erosive. Flatter topography is found to the east, and streams tend to have less gradient and more silty substrates than in the Southeastern Plains ecoregion (65). Oak-hickory and oak-hickory-pine forest was the natural vegetation. Agriculture is now the dominant land cover in the Kentucky and Tennessee portion of the region, while in Mississippi there is a mosaic of forest and cropland.

75. SOUTHERN COASTAL PLAIN

The Southern Coastal Plain consists of mostly flat plains, but it is a heterogeneous region containing barrier islands, coastal lagoons, marshes, and swampy lowlands along the Gulf and Atlantic coasts. In Florida, an area of discontinuous highlands contains numerous lakes. This ecoregion is lower in elevation with less relief and wetter soils than the Southeastern Plains (65). It is warmer, more heterogeneous, and has a longer growing season and coarser textured soils than the Middle Atlantic Coastal Plain (63). Once covered by a variety of forest communities that included trees of longleaf pine, slash pine, pond pine, beech, sweetgum, southern magnolia, white oak, and laurel oak, land cover in the region is now mostly slash and loblolly pine with oak-gum-cypress forest in some low lying areas, citrus groves in Florida, pasture for beef cattle, and urban.

76. SOUTHERN FLORIDA COASTAL PLAIN

The frost free climate of the Southern Florida Coastal Plain makes it distinct from other ecoregions in the conterminous United States. This region is characterized by flat plains with wet soils, marshland and swamp land cover with everglades and palmetto prairie vegetation types. Relatively slight differences in elevation and landform have important consequences for vegetation and the diversity of habitat types. Although portions of this region are in parks, game refuges, and Indian reservations, a large part of the region has undergone extensive hydrological and biological alteration.

77. NORTH CASCADES

The terrain of the North Cascades is composed of high, rugged mountains. It contains the greatest concentration of active alpine glaciers in the conterminous United States and has a variety of climatic zones. A dry continental climate occurs in the east and mild, maritime, rainforest conditions are found in the west. It is underlain by sedimentary and metamorphic rock in contrast to the adjoining Cascades which are composed of volcanics.

78. KLAMATH MOUNTAINS

The ecoregion is physically and biologically diverse. Highly dissected, folded mountains, foothills, terraces, and floodplains occur and are underlain by igneous, sedimentary, and some metamorphic rock. The mild, subhumid climate of the Klamath Mountains is characterized by a lengthy summer drought. It supports a vegetal mix of northern Californian and Pacific Northwest conifers.

79. MADREAN ARCHIPELAGO

Also known as the Sky Islands in the United States, this is a region of basins and ranges with medium to high local relief, typically 1,000 to 1,500 meters. Native vegetation in the region is mostly grama-tobosa shrubsteppe in the basins and oak-juniper woodlands on the ranges, except at higher elevations where ponderosa pine is predominant. The region has ecological significance as both a barrier and bridge between two major cordilleras of North America, the Rocky Mountains and the Sierra Madre Occidental.

80. NORTHERN BASIN AND RANGE

This ecoregion contains arid tablelands, intermontane basins, dissected lava plains, and scattered mountains. Non-mountain areas have sagebrush steppe vegetation; cool season grasses and Mollisols are more common than in the hotter-drier basins of the Central Basin and Range where Aridisols are dominated by sagebrush, shadscale, and greasewood. Ranges are generally covered in Mountain sagebrush, mountain brush, and Idaho fescue at lower and mid-elevations; Douglas-fir, and aspen are common at higher elevations. Overall, the ecoregion is drier and less suitable for agriculture than the Columbia Plateau and higher and cooler than the Snake River Plain. Rangeland is common and dryland and irrigated agriculture occur in eastern basins.

81. SONORAN BASIN AND RANGE

Similar to the Mojave Basin and Range to the north, this ecoregion contains scattered low mountains and has large tracts of federally owned land, most of which is used for military training. However, the Sonoran Basin and Range is slightly hotter than the Mojave and contains large areas of palo verde-cactus shrub and giant saguaro cactus, whereas the potential natural vegetation in the Mojave is largely creosote bush.

82. LAURENTIAN PLAINS AND HILLS

This mostly forested region, with dense concentrations of continental glacial lakes, is less rugged than the Northeastern Highlands (58) to the west and considerably less populated than the Ecoregion 59 to the south. Vegetation here is mostly spruce-fir with some patches of maple, beech, and birch, and the soils are predominantly Spodosols. By contrast, the forests in the Northeastern Coastal Zone (59) to the south are mostly white, red, and jack pine and oak-hickory, and the soils are generally Inceptisols and Entisols.

83. EASTERN GREAT LAKES AND HUDSON LOWLANDS

This glaciated region of irregular plains bordered by hills generally contains less surface irregularity and more agricultural activity and population density than the adjacent Northeastern Highlands (58) and Northern Appalachian Plateau and Uplands (60). Although orchards, vineyards, and vegetable farming are important locally, a large percentage of the agriculture is associated with dairy operations. The portion of this ecoregion that is in close proximity to the Great Lakes experiences an increased growing season, more winter cloudiness, and greater snowfall.

84. ATLANTIC COASTAL PINE BARRENS

This ecoregion is distinguished from the coastal ecoregion (63) to the south by its coarser-grained soils, cooler climate, and Northeastern oak-pine potential natural vegetation. The climate is milder than the coastal ecoregion (59) to the north that contains Appalachian Oak forests and some Northern hardwoods forests. The physiography of this ecoregion is not as flat as that of the Middle Atlantic Coastal Plain, but it is not as irregular as that of the Northeastern Coastal Zone (59).

101. ARCTIC COASTAL PLAIN

The northernmost ecoregion in the United States is bounded on the north and the west by the Arctic Ocean and stretches eastward nearly to the international boundary between Alaska and the Yukon Territory, Canada. The poorly drained treeless coastal plain rises very gradually from sea level to the adjacent foothills. The region has an arctic climate, and the entire area is underlain by thick permafrost. Because of poor soil drainage, wet graminoid herbaceous communities are the predominant vegetation cover, and numerous thaw lakes dot the region.

102. ARCTIC FOOTHILLS

This ecoregion consists of a wide swath of rolling hills and plateaus that grades from the coastal plain (101) on the north to the Brooks Range (103) on the south. The east-west extent of the ecoregion stretches from the international boundary between Alaska and the Yukon Territory, Canada, to the Chukchi Sea. The hills and valleys of the region have better defined drainage patterns than those found in the coastal plain to the north and have fewer lakes. The area is underlain by thick permafrost and many ice-related surface features are present. The region is predominantly treeless and is vegetated primarily by mesic graminoid herbaceous communities.

103. BROOKS RANGE

This ecoregion consists of several groups of rugged, deeply dissected mountains carved from uplifted sedimentary rock. The region traverses much of the east-west extent of northern Alaska, from the Canadian border to within 100 km of the Chukchi Sea. Elevation of mountain peaks ranges from 800 m in the relatively low Baird Mountains in the west to 2,400 m in the central and eastern Brooks Range. Pleistocene glaciation was extensive, and small glaciers persist at elevations above 1,800 m. An arctic climatic regime and unstable hillslopes maintain a sparse cover of dwarf scrub vegetation throughout the mountains through some valleys provide more mesic sites for graminoid herbaceous communities.

104. INTERIOR FORESTED LOWLANDS AND UPLANDS

This ecoregion represents a patchwork of ecological characteristics. Region-wide unifying features include a lack of Pleistocene glaciation, a continental climate, a mantling of undifferentiated alluvium and slope deposits, a predominance of forests dominated by spruce and hardwood species, and a very high frequency of lightning fires. On this backdrop of characteristics is superimposed a finer grained complex of vegetation communities resulting from the interplay of permafrost, surface water, fire, local elevational relief, and hillslope aspect.

105. INTERIOR HIGHLANDS

This discontinuous ecoregion is composed of rounded, low mountains, often surmounted by rugged peaks. The highlands primarily sustain dwarf scrub vegetation and open spruce stands, though graminoid herbaceous communities occur in poorly drained areas. Mountains in most parts of this region rise to at least 1,200 m, and many rise higher than 1,500 m. Most of the higher peaks were glaciated during the Pleistocene.

106. INTERIOR BOTTOMLANDS

This ecoregion is composed of flat to nearly flat bottomlands along larger rivers of interior Alaska. The bottomlands are dotted with thaw and oxbow lakes. Soils are poorly drained and shallow, often over permafrost. Predominant vegetation communities include forests dominated by spruce and hardwood species, tall scrub thickets, and wetlands.

107. YUKON FLATS

The Yukon Flats is a relatively flat, marshy basin floor in east central Alaska that is patterned with braided and meandering streams, numerous thaw and oxbow lakes, and meander scars. Surrounding the basin floor is a variable band of more undulating topography with fewer water bodies. In many respects the ecoregion is similar to the Interior Bottomlands Ecoregion (106), but differs in climatic characteristics. Temperatures tend to be more extreme; summers are warmer and winters are colder than in other areas of comparable latitude. The ecoregion also receives less annual precipitation than the Interior Bottomlands. Forests dominated by spruce and hardwood species, tall scrub communities, and wet graminoid herbaceous communities are the predominant vegetation types.

108. OGILVIE MOUNTAINS

This ecoregion, along the eastern edge of Alaska, consists of flat-topped hills eroded from a former plain and broad pediment slopes built up from mountains that are much subdued from their former stature. Karst topography is common. Mesic graminoid herbaceous communities and tall scrub communities are widespread throughout the region. Forest communities occupy lower hillslopes and valleys.

109. SUBARCTIC COASTAL PLAINS

This ecoregion mainly includes coastal plains of the Kotzebue Sound area and the Yukon and Kuskokwim River delta area. Flat, lake-dotted coastal plains and river deltas are characteristic of the region. Streams have very wide and serpentine meanders. Soils are wet and the permafrost table is shallow, providing conditions for wet graminoid herbaceous communities, the predominant vegetation type. The region is affected by both marine and continental climatic influences.

110. SEWARD PENINSULA

Some of the oldest geologic formations in Alaska provide a backdrop for this predominantly treeless ecoregion. Mesic graminoid herbaceous and low scrub communities occupy extensive areas. The ecoregion is surrounded on three sides by water, yet this has little ameliorating effect on the climate. Winters tend to be long and harsh and summers short and cool.

111. AHKLUN AND KILBUCK MOUNTAINS

Located in southwestern Alaska off Bristol and Kuskokwim Bays, this ecoregion is composed of steep, sharp, often ringlike groupings of rugged mountains separated by broad, flat valleys and lowlands. The mountains were glaciated during the Pleistocene epoch, but only a few small glaciers persist. Dwarf scrub communities are the predominant vegetation cover in the mountains. Tall scrub and graminoid herbaceous communities are common in valleys and on lower mountain slopes. Valley bottoms may support stands of spruce and hardwood species.

112. BRISTOL BAY-NUSHAGAK LOWLANDS

This lowland ecoregion is located in southwestern Alaska off Bristol Bay. The region has rolling terrain, formed from morainal deposits. Soils of the lowlands are somewhat better drained than soils of the Subarctic Coastal Plains Ecoregion (109). Dwarf scrub communities are widespread, but large areas of wetland communities occur. Lakes are scattered throughout the lowlands, but are not nearly as numerous as in the Subarctic Coastal Plains.

113. ALASKA PENINSULA MOUNTAINS

This ecoregion is composed of rounded, folded and faulted sedimentary ridges intermittently surmounted by volcanoes. The mountains were heavily glaciated during the Pleistocene epoch. A marine climate prevails, and the region is generally free of permafrost. Many soils formed in deposits of volcanic ash and cinder over glacial deposits and are highly erodible. Vegetation cover commonly consists of dwarf scrub communities at higher elevations and on sites exposed to wind, and low scrub communities at lower elevations and in more protected sites.

114. ALEUTIAN ISLANDS

This ecoregion in southwestern Alaska is composed of a chain of sedimentary islands (eroded from older volcanic formations) that are crowned by steep volcanoes. Maritime climate prevails. The region is south of the winter sea ice pack and is generally free from permafrost. Vegetation cover mainly consists of dwarf scrub communities at higher elevations and on sites exposed to wind, and of graminoid herbaceous communities in more protected sites.

115. COOK INLET

Located in the south central part of Alaska adjacent to the Cook Inlet, the ecoregion has one of the mildest climates in the State. The climate, the level to rolling topography, and the coastal proximity have attracted most of the settlement and development in Alaska. The region has a variety of vegetation communities but is dominated by stands of spruce and hardwood species. The area is generally free from permafrost. Unlike many of the other nonmontane ecoregions, the Cook Inlet Ecoregion was intensely glaciated during the Pleistocene.

116. ALASKA RANGE

The mountains of south central Alaska, the Alaska Range, are very high and steep. This ecoregion is covered by rocky slopes, icefields, and glaciers. Much of the area is barren of vegetation. Dwarf scrub communities are common at higher elevations and on windswept sites where vegetation does exist. The Alaska Range has a continental climatic regime, but

because of the extreme height of many of the ridges and peaks, annual precipitation at higher elevations is similar to that measured for some ecoregions having maritime climate.

117. COPPER PLATEAU

This ecoregion in south central Alaska occupies the site of a large lake that existed during glacial times. The nearly level to rolling plain has many lakes and wetlands. Soils are predominantly silty or clayey, formed from glaciolacustrine sediments. Much of the region has a shallow permafrost table, and soils are poorly drained. Black spruce forests and tall scrub, interspersed with wetlands, are the major types of vegetation communities.

118. WRANGELL MOUNTAINS

This ecoregion consists of steep, rugged mountains of volcanic origin that are extensively covered by ice fields and glaciers. Most slopes are barren of vegetation. Dwarf scrub tundra communities, consisting of mats of low shrubs, fobs, grasses, and lichens, predominate where vegetation does occur. The climate has harsh winters and short summers.

119. PACIFIC COASTAL MOUNTAINS

The steep and rugged mountains along the southeastern and south central coast of Alaska receive more precipitation annually than either the Alaska Range (116) or Wrangell Mountains (118) Ecoregions. Glaciated during the Pleistocene, most of the ecoregion is still covered by glaciers and ice fields. Most of the area is barren of vegetation, but where plants do occur, dwarf and low scrub communities dominate.

120. COASTAL WESTERN HEMLOCK-SITKA SPRUCE FORESTS

Located along the southeastern and south central shores of Alaska, the terrain of this ecoregion is a result of intense glaciation during late advances of the Pleistocene. The deep, narrow bays, steep valley walls that expose much bedrock, thin moraine deposits on hills and in valleys, very irregular coastline, high sea cliffs, and deeply dissected glacial moraine deposits covering the lower slopes of valley walls are all evidence of the effects of glaciation. The region has the mildest winter temperatures in Alaska, accompanied by large amounts of precipitation. Forests of western hemlock and Sitka spruce are widespread.